NAMRL Technical Memorandum 99-01

AIRCREW MODIFIED EQUIPMENT LEADING TO INCREASED ACCOMMODATION (AMELIA) SUMMARY

A. H. Bransdorfer and K. R. Johnson



20000330 112

Naval Aerospace Medical Research Laboratory
51 Hovey Road
Pensacola, Florida 32508-1046

Approved for public release; distribution unlimited.

NAVAL AEROSPACE MEDICAL RESEARCH LABORATORY 51 HOVEY ROAD, PENSACOLA, FL 32508-1046

NAMRL Technical Memorandum 99-01

AIRCREW MODIFIED EQUIPMENT LEADING TO INCREASED ACCOMMODATION (AMELIA) SUMMARY

A. H. Bransdorfer and K. R. Johnson

Approved for public release; distribution unlimited.

ABSTRACT

Aviation life support systems (ALSS) equipment is a critical and essential component for mission success in naval aviation. Anecdotal comments by naval aircrews have indicated that ALSS equipment is perceived as ill-fitting and substandard. Additionally, many aircrews in naval aviation are not satisfied with current urine collection devices (UCDs). The Aircrew Modified Equipment Leading to Increased Accommodation (AMELIA) survey was completed by 2,055 U.S. Navy and Marine Corps aircrew. The sample population included 85 women and 1,970 men. According to the survey results, ALSS equipment appears to fit slightly better than "ok" in all but the anti-exposure suit. The overall performance of current ALSS was rated slightly above the median with the exception of the anti-exposure suit (rated below the median). Aircrews identified the flight suit as the number-one priority with respect to safety, thermal protection, and comfort. The helmet was identified as the number one priority item with respect to survivability. The majority of the sampled aircrew has required the use of urine collection devices (UCDs) during flight. These aircrews selected the piddle pack and relief tube as moderately acceptable solutions for urination during flight.

Acknowledgments

We would like to acknowledge a number of individuals without whom this report could not have been completed. First, CDR T.L. Pokorski, LCDR B.E. Ortel, and LCDR D.G. Smith were the catalysts at the inception of the AMELIA study. A special thanks to J.G. Gandy and H.E.Cotton for formatting the tables in the appendix. Numerous individuals at all of the Aviation Survival Training Centers (ASTCs) spent hours administering and collecting the surveys. We would like to thank P.D. Collyer for his tireless contribution entering data and assisting in the statistical analyses. We are also thankful to all of the aviators who completed the questionnaire. Through their efforts, this report has become a reality.

PROBLEM

Aviation life support systems (ALSS) equipment is a critical component for mission success in naval aviation. The continued development and improvement of ALSS is mission essential. According to anecdotal comments by naval aircrew, ALSS equipment has historically been perceived as ill fitting and substandard. Additionally, many aviators in naval aviation are not satisfied with current urine collection devices (UCDs).

BACKGROUND

The Naval Air Systems Command (NAVAIRSYSCOM) funded an initial survey in 1993 to assess problems that female aircrew were encountering with current ALSS. The initial survey recorded responses for 67% of female aircrew in the Navy and Marine Corps. Following the initial survey, the study was expanded to include all naval aircrew, both male and female. The Aircrew Modified Equipment Leading to Increased Accommodation (AMELIA) project was an effort sponsored by the Naval Air Warfare Center, Aircraft Division (NAWC-AD) and Program Manager Air-202 (PMA-202).

The purposes of this study were to evaluate ALSS fit characteristics, determine aircrew ALSS priorities, and identify problems associated with UCDs. The Naval Aerospace Medical Research Laboratory (NAMRL) designed the survey instrument, coordinated its administration, and analyzed the results. Completed surveys were received from 2,055 U.S. Navy and Marine Corps aircrew; this sample included 85 women and 1,970 men.

DISCUSSION

Respondents were asked to answer questions concerning the fit and performance of selected ALSS equipment in the first section of the questionnaire. The fit of ALSS was scored from one to three, with one being a "poor" fit, two an "ok" fit, and three fitting "well." The overall performance of an item was rated on a scale from one to five, one being the lowest (poor performance) and five the highest (good performance).

The fit of ALSS appears to be an important fleet concern during ready room conversations with aircrew. According to the respondents of the AMELIA survey, ALSS equipment appears to fit slightly better than "ok" in all but the anti-exposure suit (Table 1). The overall performance of current ALSS was slightly above the middle value of three. Again the anti-exposure suit was the exception with a performance rating of 2.8 (Table 1).

Equipment	Fit*	Performance**
Flight Suit	2.7	4.2
Flight Jacket	2.5	4.2
Flight Boots	2.5	4.2
Flight Gloves	2.6	4.3
Torso Harness	2.3	3.8
SV-2B	2.1	3.3
Anti-G Suit	2.5	4.1
O2 Mask	2.2	3.5
Helmet	2.3	3.7
Anti-Exposure Suit	1.9	2.8
Anti-Exposure Liner	2.2	3.4

Table 1. Mean ALSS Fit Sores.

Anecdotally, many aviators may be more likely to make comments within a ready room than may have been evidenced by the current questionnaire. To account for this limitation, aircrew members were encouraged to write in comments about the fit of each piece of ALSS they used. An appendix is provided for review in lieu of a lengthy

^{*} 1 = poor, 2 = ok, 3 = well.

^{**} 1 = low, 5 = high.

discussion within this summary. The anecdotal comments in the appendix are listed in order of frequency and are grouped by designator and aircraft platform.

The second section of the survey was designed so respondents could rank ALSS items according to 1) safety, 2) survivability, 3) thermal protection, and 4) comfort. The equipment in Table 2 was grouped based upon the total number of times the specific gear was selected by aircrew. The top items for all platforms in each category are listed in Table 2.

Table 2. ALSS Priorities.

Safety	Survivability	Thermal Protection	Comfort
Flight Suit (30.2)	Helmet (25.4)	Flight Suit (29.9)	Flight Suit (27.1)
Helmet (29.2)	SV-2B (23.6)	Anti-Exposure Suit (25.6)	Helmet (22.2)
SV-2B (13.7)	Flight Suit (19.0)	Flight Jacket (15.4)	Anti-Exposure Suit (19.2)
Anti-Exposure Suit (9.5)	Anti-Exposure Suit (11.7)	Boots (9.3)	SV-2B (11.7)

Note: The numbers in parentheses refer to the percentage of responses listing the item as the level-one priority.

The equipment listed in Table 2 highlights the primary ALSS priorities of naval aircrew. The priority items listed by aircrew provide continued support for the development and improvement of ALSS as demonstrated by the customer.

The third section of the survey was designed to identify problems and list solutions related to UCDs. Of the 2,055 respondents completing the section referring to UCD's, 81% had flown missions requiring the use of a UCD.

Aircrew members were asked to rate a number of UCD's on an acceptability scale. The relief tube and piddle pack were identified as moderately acceptable interim (3.7 and 3.2, respectively) and long-term solutions (3.8 and 3.2, respectively) for urination during flight. The tactical jet community ranked the piddle pack above the relief tube. Overall, however, the relief tube was preferred to the piddle pack as a solution for urination during flight.

Aircrew members were also asked how they dealt with urination during flight. A number of methods were listed. The most common method of accounting for urination during flight was "holding it." The piddle pack was the next preferred method of choice by aircrew. Table 3 lists the top five methods of dealing with the need to urinate during flight by all aircrew surveyed.

Table 3. Methods for Dealing With Urination During Flight.

Methods	Percentage
"Hold it"	20.4
Piddle Pack	17.7
Land Aircraft	13.8
Relief Tube	12.4
Pre-Flight "Head Call"	8.5

CONCLUSION

Aviator-mounted systems are mission essential as well as critical for safety and survivability. The AMELIA Report provides a source of data to identify areas for improvement and continued development of ALSS.

APPENDIX

ALSS SURVEY TALLY SHEETS:

Flight Suit
Flight Jacket
Flight Boots
Flight Gloves
Torso Harness
Integrated Torso Harness
SV-2
Anti-G Suit
Oxygen Mask
Helmet
Anti-Exposure Suit
Anti-Exposure Liner
Females

Intentionally blank.

ALSS Survey Tally Sheet (FY-95-97) NAMRL

Freezest processible during flight		Flight Suit							
Properties Prop Helio Pro									
Breast pockets inaccessible during flight 621 158 153 270 420 72 Bring back skindul cutter pocket 289 66 79 744 716 71 715 Bring back skindul cutter pocket 281 261 281 71 71 71 71 71 71 71	#	Comment	Total	Jet	Prop	Helo	Pilot	NFO	AC AC
simp back strong cutch distributed cutch cutch distributed cutch pocket 282 66 79 144 41 41 Faired back strong cutch distribing cutch distribing and strong back strong cutch distribing cutch distribing cutch distribing 282 69 120 73 176 37 Fearlier break earlier flatching cutch stitching cutch distribing cutch distributed c		Breast nockets inaccessible during flight	621	158	193	270	420	72	129
The definition of the properties of the properties break easily 155 156	-10	Bring back shroud cutter pocket	289	99	62	144	164	41	84
Propertiable under G-sult Registrate R	1 4	Beinforce crotch etitching	262	69	120	73	175	37	212
Properticated by the control of th	٦	Zinner tahs break easily	251	81	67	103	160	28	63
136 26 60 50 86 15 201 21 22 34 53 54 202 202 34 53 74 93 203 203 74 13 203 204 74 75 74 94 204 205 205 204 74 75 74 74 205 205 205 205 205 205 205 205 205 205 205 205 205 205 205 205 205 205 205 205 205 205 205 205 205 205 205 205 205 205 205 205 205 205 205 205 205 205 205 205 205 205 205 205 205 205 205 205 205 205 205 205 205 205 205 205	7	Il Incomfortable under G-suit	162	28	40	64	85	18	59
Varieties are not necessarily to be sufficient between the kineling based rules fit poorly Varieties are burn hazard when kineling besent suits fit poorly Varieties are burn hazard Varieties V	٥	Heavier material in seat needed	136	26	09	50	86	15	45
Veed FOD flap 113 26 34 53 71 9 Wist needs more flexability 53 20 17 16 17 13 Weed separate male/female 41 15 14 18 23 5 Stacks as a burn hazard 30 10 10 10 18 2 5 Stacks a stall fit poorly 20 5 8 7 8 4 Posed cushioned kneepads 18 3 7 8 7 8 4 A bead cushioned kneepads 18 3 7 8 2 2 2 A bead cushioned kneepads 18 3 7 8 3 2 2 4 4 4 4 4 4 4 4 4 4 4 4 5 6 3 6 5 8 4 4 4 4 4 4 4 4 4 4 4	,	Poor supply (supply system)	126	26	41	59	85	14	27
Arist needs more flexability 63 20 17 16 17 13 Nist needs male/female 42 15 14 13 16 9 Separate male/female 42 15 14 13 16 9 Satches are burn hazard 30 10 10 10 18 25 Satches are burn hazard 30 6 8 7 10 4 Seat classification (old suit) 20 5 8 7 10 4 Veed cushioned kneepads 18 2 8 7 10 4 Veed cushioned kneepads 18 2 5 11 9 2 Veed cushioned kneepads 18 2 6 3 6 3 6 5 Viestig in lower 18 falls across knee when kneeling 18 2 6 3 6 3 6 5 Viestig in lower 18 falls across knee when kneeling 18 2 6 3		Need FOD flan	113	26	34	53	71	6	31
Veed separate male/fernale 42 15 14 13 16 9 Jebert surfich actors are burn hazard 41 12 11 18 23 5 Jesent sults fit poorly 20 5 8 7 10 4 Jesent sults fit poorly 19 10 7 2 8 4 Jesed cushioned kneepads 18 3 7 8 2 2 Jesed cushioned kneepads 18 3 7 8 2 2 Jesed cushioned kneepads 18 3 7 8 4 4 Jesed cushioned kneepads 18 3 7 8 2 2 Jesed cushioned kneepads 16 7 6 3 6 1 3 Jesed cushioned kneeps 15 3 5 1 3 6 5 Jews vall for pockets to odeep 15 3 4 5 6 0 Jews vall fire pockets	٥	Wrist needs more flexability	53	20	17	16	17	13	23
Secret Series are burn hazard 41 12 11 18 23 5 Patches are burn hazard 30 10 10 10 18 2 Desert suits fit poorty 20 5 8 7 10 4 Poor pocket position (old suit) 19 10 7 8 2 2 Abed cushioned kneeppads 18 3 7 8 2 2 2 Zipper on lower leg falls across knee when kneeling 18 3 7 6 3 6 5 Alex suit pockets steless 16 7 6 3 6 5 4 Alew suit pockets steless 12 3 4 5 6 0 8 0 9 8 0 9 8 0 0 9 8 0 0 9 8 0 0 0 0 0 0 0 0 0 0 0 0 0	, 6	Need separate male/female	42	15	14	13	16	6	17
Desert sulfs fit poorly 30 10 10 10 10 4 Desert sulfs fit poorly Poor pocket position (old suit) 20 5 8 7 10 4 Poor pocket position (old suit) 19 10 7 8 7 8 4 Need cushioned kneepads 18 3 7 8 2 2 2 All sing inner tripip bocket 18 3 5 6 3 6 5 New suit pockets useless 16 9 5 1 9 6 5 New suit carpo pockets too deep 8 3 2 6 0 0 New suit carpo pockets too deep 8 3 2 6 0 0 New suit carpo pockets too deep 8 3 2 1 5 0 New suit fits poorly New suit fits poorly 6 3 2 1 1 1 Need more sizes New suit pocket flap catches	1	Datches are him hazard	41	12	11	18	23	5	10
Poor pocket position (old suit) 20 5 8 7 10 4 Need cushioned kneepads 19 10 7 2 8 4 Need cushioned kneepads 18 3 7 6 3 2 2 Zipper on lower leg falls across knee when kneeling 18 2 5 11 9 2 Missing inner thigh pocket 16 7 6 3 6 5 6 New suit pockets useless 12 3 6 5 1 3 9 8 0 9 8 0 9 8 0 0 9 8 0 0 9 8 0 0 9 8 0 0 9 8 0 0 9 8 0 <td< td=""><td>1</td><td></td><td>30</td><td>10</td><td>10</td><td>10</td><td>18</td><td>2</td><td>10</td></td<>	1		30	10	10	10	18	2	10
Need customed kneepads 19 10 7 2 8 4 Sipper on lower leg falls across knee when kneeling 18 3 7 8 2 2 Zipper on lower leg falls across knee when kneeling 18 2 5 11 9 2 Missing inner thigh pocket 16 9 5 1 9 6 5 New suit pockets useless 12 3 4 5 6 0 New suit side zippers useless 12 3 4 5 6 0 New suit side zippers useless 12 3 4 5 6 0 New suit cargo pockets too deep 8 3 2 1 5 0 New suit fisp poorly 1 3 1 1 1 1 1 Need three weights: light, normal, winter 5 1 2 1 2 1 Need unce sizes 1 1 2 1 1 1 <td>13</td> <td></td> <td>20</td> <td>2</td> <td>8</td> <td>7</td> <td>10</td> <td>4</td> <td>9</td>	13		20	2	8	7	10	4	9
Image: Control of the contro	14		19	10	7	2	8	4	7
Missing inner triple pocket 18 2 5 11 9 2 New suit pockets useless 16 7 6 3 6 5 New suit pockets useless 12 3 6 1 3 9 New suit pockets useless 12 3 4 5 6 0 New suit side zippers useless 12 3 4 5 6 0 New suit side zippers useless 12 3 4 5 6 0 New suit cargo pockets too deep 18 3 2 1 5 0 New suit fits poorly New suit fits poorly 6 3 2 1 2 2 Need more sizes New suit for short in crotch 5 1 1 1 1 New suit too short in crotch 3 1 1 1 0 1 New suit too small for big or tall person 1 0 0 1 0 0 <	15	Zinner on lower leg falls across knee when	18		7	8	2	2	14
New sult pockets useless 16 7 6 3 6 5 New sult pockets useless 12 3 6 1 3 9 New sult poor quality 12 3 4 5 6 0 New sult side zippers useless 12 3 4 5 6 0 New sult cargo pockets too deep 8 3 2 1 5 0 New sult cargo pockets too deep 8 3 2 1 5 0 New sult first poorly New sult fits poorly 5 1 2 2 1 1 1 Need more sizes New sult for short in crotch 3 1 1 1 1 1 0 1 New sult too short in crotch 3 1 1 1 0 1 0 1 0 1 New sult too small for big or tall person 1 0 0 1 0 0 1 0 0	97		18	2	5	11	6	2	7
New suit por quality 15 9 5 1 3 9 New suit side zippers useless 12 3 4 5 6 0 New suit side zippers useless 12 3 4 5 6 0 New suit side zippers useless 6 3 2 6 0 0 Prefer older style to new style 6 3 2 1 5 0 New suit raising thigh pockets 6 3 2 1 5 0 New suit flis poorly New suit flis poorly 5 1 1 1 1 Need three weights: light, normal, winter 5 1 1 1 1 1 Need three weights: light, normal, winter 5 1 1 1 1 1 Need three weights: light, normal, winter 5 1 1 1 1 1 New suit pocket flap catches 4 1 2 2 1 1 1	1	New suit pockets useless	16	7	9	3	9	5	2
New suit side zippers useless 12 3 4 5 6 0 New suit side zippers useless 12 3 4 5 6 0 New suit cargo pockets too deep 8 3 2 1 5 0 New suit cargo pockets too deep 6 3 2 1 5 0 New suit fits poorly 6 3 2 1 2 2 Need three weights: light, normal, winter 5 2 1 1 1 1 1 Need three weights: light, normal, winter 5 1 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 1 1 0 0 1 0 0 1	1 2	New suit poor quality	15	6	2	1	3	6	က
New suit cargo pockets too deep 12 3 4 5 6 0 New suit cargo pockets too deep 8 3 2 1 5 0 Prefer older style to new style 6 3 2 1 5 0 New suit missing thigh pockets 6 3 2 1 5 0 New suit fits poorly Need three weights: light, normal, winter 5 1 0 1	0	New suit side zinners useless	12	3	0	6	8	0	4
New suit missing thigh pockets 8 3 2 5 0 New suit missing thigh pockets 6 3 2 1 5 0 New suit fits poorly Need three weights: light, normal, winter 5 2 1 1 2 2 Need three weights: light, normal, winter 5 1 3 1 1 1 1 Need three weights: light, normal, winter 5 1 3 1<	200	New suit cardo pockets too deep	12	က	4	2	9	0	ဖ
New suit missing thigh pockets 6 3 2 1 5 0 New suit fits poorly 6 3 2 1 2 1 <td< td=""><td>2 6</td><td> Prefer older style to new style</td><td>80</td><td>3</td><td>3</td><td>2</td><td>5</td><td>0</td><td>က</td></td<>	2 6	Prefer older style to new style	80	3	3	2	5	0	က
nal, winter 6 3 2 1 2 2 4 1 2 1 1 1 1 3 1 1 1 1 0 3 1 1 1 0 1 4 1 1 1 0 1 4 1 1 1 0 1 4 1 1 1 0 1 4 1 0 0 1 0 4 1 0 0 1 0 4 1 0 0 1 0 9 1 0 0 0 0	100	New suit missing thigh pockets	9	3	2	1	5	0	-
s: light, normal, winter 5 2 1 1 2 p catches 4 1 2 1 1 1 p catches 4 1 2 1 1 0 in crotch 3 1 1 0 1 ly ching, thread 1 0 0 1 0 r tall person 1 0 0 1 0 nip & crotch 1 0 0 1 0	25	New suit fits poorly	9	က	2	1	2	2	1
ad 1 3 1 1 1 1 1 1 1 0 0 1 1 0 0 1 1 0 0 0 0	24	1;;	2	2	2	-	-	2	2
ad 1 2 1 1 0 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 1 1 1 0 0 1 1 1 0 0 1 1 0 0 1 1 0 0 1 1 1 0 0 1 1 1 0 0 0 1 1 1 0 0 0 1 1 1 0 0 0 0 1 1 1 0	25		9	1	3	-	-	-	8
ad 1 1 1 2 0 1 1 3 1 1 1 2 0 1 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 1	٦	New suit nocket flan catches	4	1	7	+	-	0	က
read 3 1 1 1 0 0 1 Son 1 Son 1 1 0 0 0 1 1 0 0 0 1 1 0 0 0 1 1 0 0 0 1 1 0 0 0 1 1 0	200	New suit too short in crotch	3	-	-	1	2	0	-
1 1 0 0 0 1 1 0 0 0 1 1 0 0 0 1 1 0 0 0 0 1 1 1 0 0 0 0 0 1 1 1 0	200	Wears out too easily	3	-	1	1	0	-	2
1 0 0 1 1 0 0 1 1 0 0 0 1 1 0 0 0 0 1 1 0 0 0 0 0 1 1 0 0 0 0 0 0 1 1 0	100	Seams rin/Poor stitching thread	-	_	0	0	1	0	0
1 0 0 1 0	3	Too small for big or fall person	ļ.	0	0	1	-	0	0
	ř	New suit bacay in hip & crotch	+	0	0	1	0	0	-
	,								

ALSS Survey Tally Sheet (FY-95-97) NAMRL

	Flight Jacket								
#	Comment	Total	Jet	Prop	Helo	Pilot)t	NFO	AC
:	Leather jacket needs a removable liner	82	33	22	27	38	_	70	22
2		74	20	38	16	30		13	34
3	3 Water proof	92	18	24	23	34		14	17
4	4 Winter jacket needs lining	37	၈	17	11	27		9	4
25	5 Integrate low-profile hood into collar	36	11	12	13	25		0	7
9	6 Snag hazard	31	6	13	6	17		6	2
)	7 Winter lacket needs collar lining	28	6	11	8	18		7	3
000	8 Difficult to don/take off in flight	14	2	7	9	7		7	5
6	Leather jackets need a place for earplugs	14	9	1		6	_	-	4
10		13	10	2	1	6		က	1
11	11 Needs FOD flap	13	_	7	9	6		0	4
15	12 Summer zippers bad	12	4	2	9	6		1	2
13	13 Issue both winter/summer	10	က	2	9	4		0	9
14	14 Sleeves are too short	6	2	က	4	7		1	1
15	Jacket too short when seated (torso size)	တ	4	2	3	2		2	4
16	16 More sizes needed	7	0	4	3	5		0	2
17	17 Difficult to fit under SV-2. other equipment	9	-	က	2	3		0	က
18	18 Poor quality (seams tear, etc.)	2	-	3	1	2		0	7
19	19 Need summer and winter versions	2	-	3	1	4		0	0
20	2011 eather jacket should have side hand pockets	2	0	2	3	1		0	4
21	21 Winter jacket too bulky	3	1	1	1	0		-	2
22	Doesn't fit/work well in cockpit	2	1	1	0	0		2	0
23	23 Need larger sizes	2	2	0	0	-		1	0
24	24 Poor fit	2	0	2	0	0		0	2
25	25 Poor supply	-	0	0	1			0	0
26	26 Restricts movement	1	0	0	-	<u> </u>	_	0	-
							_		

ALSS Survey Tally Sheet (FY-95-97) NAMRL

Comment Total Jet Prop Helo Fillot NFO										
Comment Total Jet Prop Helo Pilot Need more custom sizes (widths) 109 28 48 33 65 1 Need more custom sizes (widths) 68 15 20 23 34 3 Steel custom comfortable in extreme cold/hi-alt 53 10 17 26 28 4 Need waterprofing 50 15 15 20 30 5 Too heavy 10 12 14 15 26 28 6 Too start 10 Need waterprofing 28 10 8 10 19 12 14 15 16 24 17 19 17 19 17 19 17 19 17 19 17 18 11 12 12 14 14 14 15 14									_	
Need more custom sizes (widths)	7	Commont	Total	Jet	Prop	Helo	H H		(FO	AC
hi-ait 54 15 20 23 34 36 55 10 17 15 28 36 36 50 15 10 17 26 28 36 50 15 10 17 26 28 36 50 10 10 17 26 28 36 50 10 10 10 10 10 10 10 10 10 10 10 10 10		_	109	28	48	33	2	2	17	36
hi-alt 54 11 15 28 36 36 53 10 17 26 28 36 50 15 10 17 26 28 30 30 50 50 50 50 50 50 50 50 50 50 50 50 50	- (28	15	20	23	<u>س</u>	4	7	17
11	7	- 1 =	5,4	1	15	28	<u>د</u>	9	3	16
50 15 20 30 30 30 30 30 30 30 30 30 30 30 30 30	اد	-:	5 2	: 6	17	26	2	8	5	20
ortable 12 1 15 24 15 24 15 24 15 24 15 24 15 24 15 24 15 24 25 24 25 24 25 24 25 24 25 24 25 24 25 24 25 24 25 24 25 24 25 25 24 25 25 25 25 25 25 25 25 25 25 25 25 25	4	Need waterproofing	3 5	2 4	45	20		-	2	13
ortable 12	43	Too heavy	2	2	2 7	24)(6		~	18
ortable 16 1	9	Too stiff	48	12	7.1	2		• •	,	2
ortable 16			28	10	8	2		8	4 6	,
ortable 16	٦		25	11	5	6		7	و	╢
ortable 16 1 8 7 8 1 1 11 11 11 11 11 11 11 11 11 11 11			19	2	3	6			4	4
ortable 16 4 3 9 11 11 3 3 6 7 11 3 5 3 6 7 11 5 2 4 3 7 9 2 4 3 6 7 6 0 1 5 4 3 6 6 0 1 2 4 3 6 7 4 4 3 6 8 1 1 2 3 4 4 9 2 4 3 6 1 1 2 3 6 1 1 1 2 3 2 1 1 1 1 2 2 2 0 0 0 0 2 2 2 0 0 0 0 2 2 2 0 0 0 0	۲	Need softer soles	16	-	8	2			-	-
11 13 3 3 6 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	=	I eather stran at hase of steel toe uncomfortable	16	4	3	6	_	-	-	4
11 3 5 3 7 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	- 5	Nord look for	12	2	3	9		7	3	2
11 5 2 4 3 6 6 6 6 1 2 4 3 5 5 6 6 6 1 1 6 6 6 6 1 1 6 6 6 6 6 6 6	7 -	Need lake liab	11	8	2	3		7	1	က
9 2 4 3 6 6 0 1 5 4 6 1 2 4 3 4 7 4 3 4 7 4 3 4 7 4 3 4 7 4 2 1 1 1 2 3 1 1 1 1 3 1 1 1 1 3 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 1 3 1 1 1 1 2 1 1 1 1 3 1 1 1 1 2 1 1 1 1 2 1 1 1 1 2 1 1 1 1 2 1 1 1 1	- -	Size Hot companie with and cap	+	2	2	4	_	+	3	4
Feel" 3 4 3 4 4 5 6 6 6 6 6 6 6 6 6	- ;	Side lips out easily	6	2	4	3		_	1	3
"feel" 5 4 4 5 6 6 6 6 6 6 6 6 6	-	Size imprint wears on	0	2	4	က			-	4
"feel"	_	Alr vents needed	, "	اد	-	ĸ		+	4	-
"feel" 3 2 0 4 4 2 1 1 1 1 2 2 3 3 1 1 1 1 1 3 3 3	1.	Need lining		,	- 6	, ("			-	2
"feel" 3	18	Poor supply	و	- -	7	?			,	-
"feel"	=	Need winter version	2	3	7	2			•	-
"feel" 3	7	Need better soles (insert)	4	2	1	_		7	7	-
"feel" 3	16	Need better traction	3	-	0	2		2	0	-
"feel" 3 1 1 1 1 2 1	1 6	Sole too wide interfere with nedals	က	-	1	1		3	0	0
Speed laces needed 3 0 2 1 1 Speed laces needed 2 1 0 1 2 Need desert style 2 0 0 2 0 Poor construction/quality 2 0 0 2 1 Scratch too easily 2 0 0 2 2 Need toe joint (for extended kneeling) 2 0 0 2 2	1 6		8	_	-	1		2	0	-
Speed laces nector 2 1 0 1 2 Need desert style 2 0 0 2 0 Poor construction/quality 2 0 0 2 1 Scratch too easily 2 0 0 2 2 Need toe joint (for extended kneeling) 2 0 1 1 2	ίĠ		~	0	2	-		1	_	_
Need desert style 2 0 2 0 Poor construction/quality 2 0 0 2 1 Scratch too easily 2 0 0 2 2 Need toe joint (for extended kneeling) 2 0 0 2 2	7	t Speed laces lieeueu		-	6	-		2	0	0
Poor construction/quality Scratch too easily Need toe joint (for extended kneeling) 2 0 2 1 2 2 2 2 2 2 2 2 2 3 4 1 1 2	7	Need desert style	1 (٥	,		6	0	2
Scratch too easily Need toe joint (for extended kneeling) 2 2 2 2 3	2	S Poor construction/quality	7,0		,			-	6	-
Need toe joint (for extended kneeling) 2 0 0 2 2	2	7 Scratch too easily	7	ه (1,			-	٥
7	5	8 Need toe joint (for extended kneeling)	2	0	۰,	,		,,	,	٥
	7	29 Laces need to be longer	2	9	-	-	1	-	,	,

ALSS Survey Tally Sheet (FY-95-97) NAMRL

	Flight Gloves							
		-						
#	Comment	Total	Jet	Prop	Helo	Pilot	NFO	AC
:	Poor fit in fingers	83	15	31	37	34	2	44
	2 Poor dexterity	55	34	6	12	31	13	11
100	3 Seams fall apart too easily	54	10	16	28	16	3	35
4	4 Separate gloves needed for preflight	26	11	3	12	11	8	7
	5 Gloves too thick for sense of touch	25	4	13	8	7	2	16
	6 Fingers tear too easily	24	7	5	12	12	7	11
	7 Poor fit in finders	23	9	8	6	12	0	11
	8 Poor supply	22	2	7	10	12	3	7
3,	9 Need longer fingers	21	2	10	6	11	2	8
9	10 Winter version needed	21	11	9	4	7	7	7
-	11 Heavy duty gloves needed	21	2	6	10	8	က	10
12	12 Gloves get hard after getting wet	18	8	9	4	5	2	8
1	13 Tank glove replacement inadequate	18	2	9	2	7	2	9
14	14 Fingertips interfere with fittings (parachute, harness, etc)	18	2	2	11	12	2	4
		16	2	2	6	6	0	7
16	16 Poor durability	11	က	4	4	8	0	3
	17 Difficult to use switches	11	4	4	3	8	-	2
7	18 Gloves too wide for finger length	8	0	4	4	2	-	2
1	19 More flexibility needed	9	1	2	3	9	0	0
7	20 Prefer British leather dloves	9	2	2	2	5	0	1
2	21 Seamless fingertips needed	-	1	0	0	1	0	0
2	2 Need white gloves for signaling	1	0	0	1	-	0	0
2	23 Prefer British leather gloves	1	1	0	0	0	_	0

ALSS Survey Tally Sheet (FY-95-97) NAMRL

	Torso Hamess							
#	Comment	Total	Jet	Prop	Helo	Pilot	NFO	AC
•	1 Difficult to adjust	38	25	11	2	21	11	9
	2 Interferes with preflight	33	25	5	3	19	10	2
	3 Need velcro thich straps	17	10	2	2	8	က	9
	4 New release mechanism for quick ejector needed	14	14	0	0	12	7	-
		10	8	-	1	7	2	1
	6 Restricts movement	9	7	2	1	5	3	2
	7 Very uncomfortable	6	9	2	1	4	2	က
	8 Poor sizing/fit	4	8	1	0	4	0	0
	9 Difficult to put on	4	8	0	1	4	0	0
	10 Not compatible with anti-exposure suit	2	_	1	0	2	0	0
	11 Too bulky	2	7	0	0	1	1	0
	12 Switch to USAF model	2	2	0	0	2	0	0
	13 Longer chest strap needed	-	-	0	0	1	0	0
	14 Poor availability	-	1	0	0	-	0	0

ALSS Survey Tally Sheet (FY-95-97) NAMRL

	Integrated Torso Harness						1			İ
##	Comment	Total		Jet	Prop	ojeH		Pilot	NFO	AC
~	Difficult to put on/off	16	<u> </u>	9	3	3		11	3	
1	2 Velcro comes undone	8		7	1	0		4	4	
1	3 Still need SV-2 for survival dear	8	_	4	4	0		4	4	
) 4	A Excess handing straps	_	L	7	0	0		9	-	
٦	5 Lea strans too wide	9		4	2	0		5	0	
٦	6 Not applied from for add-ons	9	_	5	-	0		4	2	
<u>`</u>	7 Door fit	3		2	0	1		2	1	
` °	2 Too billy	2		6	0	0		2	+	
ျိ	O Country	2	-	0	0	2		0	0	
" 5	10 Custom fit needed	2		2	0	0		2	0	
1	14 Zinner none out	2		2	0	0		2	0	
- 2	12 Need adanter for anti-exposure suit	2		2	0	0		2	0	
13	13 Modify harness for OBOGS	-		1	0	0		1	0	

# Comr 1 Too heavy 2 Poor fit 3 Bulky 4 Interferes 5 Poor equif 6 HEEDS bo 7 Doesn't fit 8 Flashlight 9 Neck lobe 10 More sizes	Comment	Total					-	<u></u>	AC
10987001	Comment	Total	-				_	2	1
100878900			Jec	Prop	Helo	0			
	Pavv	427	75	79	273	22.		- 58 82	122
	111	165	23	26	98	83		14	64
		132	9	80	118	86		3	31
	Journy	112	5	10	97	74		4	34
	dies with premigni	782	4	13	59	24	_	8	46
	Poor equipment position	0 6	2	2 2	35	45	H	٥	2
	HEEDS bottle interferes with movement	وا	0°	-	27	ř	+	2 2	1 46
	Doesn't fit over winter jacket	28	3	10	43	44	+	5	، اع
	Flashlight too cumbersome	35	0	3	32	27	+		x
	Nack Joha strans interfere with parachute risers	20	0	10	10	10	_	4	ဖ
DINIOI C	sizes needed	20	0	9	14	12		3	2
44 1200	More sizes lieeded	49	-	8	10	19		2	4
	Incompanion with conceasing fact (artificial concentration)	17	3	3	11	15	_	0	2
12 Need .		18	5	4	7	9		2	8
	Most most jacket	15		3	11	100		0	2
	Walit illesii jachet Too much pop-iisefiil deer	15	3	2	7	9		3	9
	illucii iloi rusciui geai	13		0	12	10	_	0	ဗ
10 F 001	Air Force version better	12	9	2	4	7	_	4	1
10 - 10 - 10 - 10 - 10 - 10 - 10 - 10 -	orde version being	1	0	0	11	6	_	0	2
100-	HEFTS peads to be shorter	-	5	0	9	10		1	0
20 Need	Need more room for nistol and ammo	9	8	0	2	8		2	0
21 Rem	Remove elastic on back for better fit	10	2	4	4	10		0	0
	Difficult to operate zippers	10	4	2	4	7	_	0	3
23 Armv	Army vest better	6	4	4	1	4		0	2
24 Not e	Not enough space for flares	6	-	2	9	7		0	7
25 Integr	Integrate life raft	7	5	2	0	2	1	-	-
	Rides over release on gunner's belt	7	3	2	2	9			0
	OBOGS bracket shifts pocket	7	4	0	3	2	\dashv		-
	Tangles in perforated safety/seat belts	9	3	-	2	က			7
	Lobes come loose under G-stress	9	0	သ	-		+		6
30 Poor	Poor quality	5	0	0	2	4	+		-
31 Need	Need more water use in-flight	5	0	-	4	3	+	,	7
	Modified for OBOGS difficult to zip/unsat	4	0	0	4	4	-		اد
33 Diffic	Difficult to adjust leg straps	4	0	2	2	-			77
	Lobes interfere with koch release	4	0	0	4	3	1	0	-
	Chest strap too long/need more Velcro	4	0	0	4	4	-		0
	Velcro ineffective (collar lobes)	4	0	2	2	0	1	2	7
	Zinner stick	2	_	0	-	-			0
	Straps can hang up on egress	2	0	2	0	0		2	0
39 Need	Need climate-specific supplies	-	1	0	0				0
40 Integ	Integrate HEEDS bottle	-	-	0	0	_		-	0

ALSS Survey Tally Sheet (FY-95-97) NAMRL

Г	Anti-G Suit							1
								_
	Comment	Total	Jet	Prop	Helo	Pilot	NFO PFO	_
7	Need full body suit	28	26	2	0	20	8	
- 0	Need fall body sur	13	12	0	-	8	2	
থ	Zineed lower back support					45	,	
က	3 Need additional for anti-exposure suit	13	2	2	3		ļ,	Т
4	4 Might interfere with ejection	9	9	0	9	6	- ,	Т
5	5 Poor stitching/bladder leaks	2	5	0	0	4	-	т
(C	6 No quick adjustment feature	2	2	0	0	2	0	1
F	7 Material pills	4	4	0	0	4	0	7
٠Ια	8 Difficult to purt on	4	4	0	0	2	7	
٥	O'Not compatible with anti-exposure suit	3	3	0	0	3	0	
۶۱۵	10 Incorporate leg restraints into suit	3	3	0	0	၁	٥	7
1	11 Need or inker inflate	8	3	0	0	2	7	
-15	12 Switch to USAF model	6	3	0	0	3	0	
4 6	13 Door fit	2	-	0	1	1	-	_
3 2	14 Need more sizes	2	2	0	0	2	0	-1
14	15 Zinners on had	2	2	0	0	-	-	
118	16 Navv G-suit better than USAF	2	2	0	0	2	0	
415	17 li off nocket can catch on power switch	2	2	0	0	2	0	
- 4	18 Mant/Need "Combat Edge System"	2	2	0	0	2	0	
116	19 Bottom pocket too small	1	-	0	0	-	0	
١						_		

ALSS Survey Tally Sheet (FY-95-97) NAMRL

	Noch Mach	_						
	OAYyen mask	+						
#	Comment	Total	Jet	Prop	Helo	Pilot	NFO	AC
•	Poor	125	6	35	0	82	32	æ
2		42	6	33	0	23	7	12
3		39	24	15	0	26	13	0
4	Better placement for bayonet fittings needed	25	8	22	0	14	2	6
. 7.	Poor comm/O2 integration	22	14	8	0	11	7	4
9	Incompatible with helmet	20	14	9	0	13	9	1
7	7 Not compatible with glasses	19	18	1	0	13	4	2
8	Smoke mask poor fit	16	13	3	0	11	3	2
6	9 Incompatible with headset	14	ω	2	1	11	7	1
10	10 Poor fit - auick don	12	9	9	0	7	က	2
11	11 More sizes needed	11	7	2	2	11	0	0
12	Need auick-don capability	10	8	7	0	4	4	2
13	Seal leaks during G's	10	2	2	0	7	က	0
14	Strans need constant adjustment	10	7	3	0	9	4	0
15	Custom fit required	10	2	2	0	4	4	2
16	Quick don frame catches on switches	10	9	4	0	7	0	က
17		8	4	4	0	9	0	2
18	OBOGS lower hose too long	7	7	0	0	7	0	0
19	Longer hose for longer seat height	7	9	-	0	2	2	0
20	I ISE USAF	5	2	0	0	4	+	0
21	21 Hose too stiff (bulky)	2	3	2	0	3	2	0
22	22 Comm cord interferes with koch fittings	4	4	0	0	4	0	0
23	Incompatible with helo helmet	3	3	0	0	3	0	0
24	24 Difficult to valsalva	3	1	1	1	3	0	0
25	Sweat collects and shorts mike	3	-	2	0	2	-	0
26	26 Uncomfortable	2	2	0	0	2	0	0
27	27 Restricts visibility (down)	-	0	1	0	-	0	0
28	Too heavv/bulkv	1	0	1	0	-	0	0
29		-	0	1	0	0	0	1
30	30 No headphones in mask (P-3)	_	1	0	0	-	0	0
31	Softer material or padding for sizing	-	-	0	0	-	0	0

ALSS Survey Tally Sheet (FY-95-97) NAMRL

							1	1	
#	Comment	Total	Jet	Prop	Helo	Pilot			AC
	1 Standardize helmets	250	28	93	66	142		9	72
	_	127	15	34	78	.7		9	4
` `		104	8	7	68	9		4	31
		85	6	11	99	9		2	9
	A New helmet HAS wire easily broken	7.1	13	25	33	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		0	12
	Make belinet warmer	58	12	18	28	4		1	15
		52	2	7	40	Š		3	15
	_	49	12	7	26	Š	31	5	13
		45	15	6	21	5		6	7
	_	40	14	12	14	2		2	4
7	11 IV visor needs better visibility (wider field of vision)	33	8	10	15	2		4	4
-		32	6	11	12	1,		3	15
-	13 Poor hearing profection	31	2	2	24	2		2	۵
- -		26	4	12	10	1		2	=
	15 Hot snots	24	2	10	6	1		2	~
\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	16 Difficult to adjust in flight	23	9	4	13	2		_	0
	17 Poor molding	23	9	1	16	-	-	2	7
		22	2	0	20			2	စ
	19 New help helmet needs visor cover/change system	20	4	7	6	-		5	2
1	Poor availability (supply, new helmet)	19	က	က	13	1		_	ω
1		11	2	٢	8	1		0	-
1		10	မ	2	2	_		-	7
"		6	1	0	8	1		3	ဖ
"		6	-	9	2	•		2	-
1		8	0	0	8	•		0	က
1	26 Visor lifts off in wind stream	8	-	4	3			0	ဖ
1	27 Need tighter fit	8	က	2	3	7		2	7
$\ \hat{\ }\ $		8	2	9	0	7		2	7
		2	2	2	0			2	0
9		9	_	1	4		_	_	0
(4)		9	0	2	4	,		0	7
(1)	32 Difficult to preflight while wearing	9	0	1	4			0	0
	33 Need air-cooled helmet	2	0	2	3	7		-	이
	34 Pads fall out	3	2	0	1			0	0
		2	0	0	2			0	0
	36 Poor construction	2	-	0	1		_	0	0
	37 New help helmet too many parts (FOD)	2	1	1	0			0	0
		1	0	0	-				0
	Visor should be UV protected	1	0	0	-			0	0
	40 More sizes needed (new helmet)	-	0	0	~		-	0	₩.

ALSS Survey Tally Sheet (FY-95-97) NAMRL

Proper Helio Priori Prop Helio Priori Prop Helio Prop Heli	:	Anti-Exposure Suit							
Restricted movement, uncomfortable, bulky 10st				1	0.00	Clot	‡olig	NFO	AC
Restricted movement, uncontrollate bulky 431 420 24 113 136 33 Meck and wrist seals unconflorate bulky 143 70 11 32 76 22 Zibper painful on underarms and chest 113 70 11 32 76 22 Deck and the with other gear 51 14 28 9 26 14 Difficult to put on Difficult to Difficult	#		- Olai	J26	ရှိ	117	334	84	103
Neck and wrist seals uncominorizable 137 70 14 32 76 22 Obsers not fit with other gear 87 47 18 22 59 14 Descent of thick with other gear 81 47 18 22 59 14 Deficult to put on prelight with anti-exposure suit 26 8 9 9 17 5 Difficult to put on Difficult to Di		<u>0</u>	431	677	56	143	136	33	28
This problem This	, 7	2 Neck and wrist seals uncomfortable	187	200	44	32	26	22	15
Discipling the with other gear St	<i></i>	3 Zipper painful on underarms and chest	213	2 ;	- 07	200	202	14	14
Difficult to put on Causes elementary of Causes e	4	4 Does not fit with other gear	/8	4,	0 8	7,	38		18
Difficult to preflight with anti-exposure suit 39 9 8 22 23 5 Causes dehydration 26 8 9 10 12 2 Causes dehydration 26 8 9 10 12 2 Difficult to put on 25 6 9 10 12 2 Need larger sizes needed 22 8 2 12 20 1 Need larger sizes needed 12 20 5 4 11 9 4 Need larger sizes needed 12 20 5 4 11 9 4 Need larger sizes 15 6 2 2 14 15 0 1 15 0 1	4,	5 Difficult to put on	51	14	28	S	89		
Causes dehydration 26 10 3 13 21 4 Difficult to put on More sizes needed 26 8 9 10 12 2 Need larger sizes needed 22 8 2 12 20 1 Need larger sizes needed 20 5 4 11 9 4 Incompatible with SV-2 needed arguer size fit all neorgable one size fit all neorgable with neti-exposure suit one pole with meti-exposure suit neorgable with anti-exposure suit needed arguer proble in bodies 14 7 3 2 3 3 1 4 4 6 4 4 6 4 4 6 4 4 6 4 4 6 4 6 4 6 4 6 4 6 4 6 4 6 4 6 7 3 3 7 3 7 3 1 8 2 1 1 1 1 1 1 1 1 1 1 4		Difficult to preflight with anti-exposure suit	39	6	æ	22	23	ş	٤,
More sizes needed 26 8 9 9 17 5 More sizes needed 25 6 9 10 12 2 Need larger size 12 2 4 11 9 4 Need larger size 20 5 4 11 9 4 Need larger size 1 18 2 2 14 16 0 Too big for small people/one size fit all 18 2 2 14 16 0 G-suit incompatible with anti-exposure suit 16 6 7 3 8 1 Unination impossible (relief fly unusable) 14 6 4 4 6 4 4 6 4 11 1		7 Causes dehydration	26	10	3	13	21	4	-
More states needed with velocing to predict the separable, with Sv2 25 6 9 10 12 2 Need larger size needed Need larger size needed size needed regard size needed with Sv2 20 5 4 11 9 4 Need larger size need larger size need larger size needed ne		Difficult to put on	26	8	6	6	17	5	4
Name of a contract of a cont		More sizes needed	25	9	6	10	12	2	11
Need ray by Stack	7	Wilder Sizes Headed	22	æ	2	12	20	1	-
The Comparison with a control particle with a comparison with a comparison with a control particle with velocities with a control particle w	= ;		20	2	4	11	6	4	7
Ober By Institute Deduction State in Compatible with anti-exposure suit 15 0 13 2 2 3 Sweat proofs in compatible with anti-exposure suit in compatible with anti-exposure suit 14 7 2 5 11 1 Unination impossible (relief fly unusable) 14 7 2 5 4 4 6 4 4 6 4 4 6 4 4 6 4 4 6 4 4 6 4 4 6 4 4 6 4 4 6 4 4 6 4 4 6 4 4 6 4 4 6 4 4 6 4 4 6 4 4 6 4 4 6 6 4 4 6 6 7 9 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		The bir for small accels/one size fit all	48	2	2	14	15	0	3
the control of the co	7	100 big for sitial people/one size it all	45	0	13	2	2	3	10
t t t t t t t t t t t t t t t t t t t	- -		15	20	7	က	8	-	9
t t t t t t t t t t t t t t t t t t t	- -	4 Oweat pools III boules El l'inotion impossible (relief fly unusable)	14	7	2	2	11	1	2
attached with Velcro 11 6 2 5 6 8 2 3 7 3 3 7 3 3 7 3 3 7 3 3 7 7 3 3 3 7 7 3 3 7 7 3 3 3 7 7 3 3 7 7 3 3 7 7 3 3 7 7 3 3 7 7 3 4 7 7 7 7	- +	Not finational in cold water equiropment	14	9	4	4	9	4	4
attached with Velcro 11 2 3 3 7 3 3 7 3 3 3 7 3 3 3 9 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		ع ای	13	9	2	2	8	2	3
attached with Velcro 11 2 3 6 5 4 Per Sper 8 2 1 5 7 0 7 1 1 5 7 0 6 4 1 1 6 0 7 1 3 1 6 0 9 3 0 6 7 0 7 1 1 5 0 9 4 1 1 1 6 0 9 1 1 3 0 10 1 1 1 0 10 1 1 1 0 11 1 1 1 1 1	- +	Mond Co day guilt	13		3	3	7	3	3
attached with Velcro 11 2 3 6 5 4 9 9 9 3 0 6 7 0 0 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	- -	o Need Co diy suit	12	-	10	-	2	2	5
oper 9 3 0 6 7 0 7 1 1 5 7 0 6 4 1 1 6 0 6 4 1 1 6 0 1 3 1 3 0 1 4 4 0 3 0 1 4 4 0 3 0 1 2 0 2 4 0 2 1 1 1 1 2 1 1 0 1 1	- 6	attached	11	2	3	9	5	4	2
8 2 1 5 7 0 7 1 1 5 3 0 6 4 4 1 1 6 0 4 4 0 0 3 0 4 4 0 0 3 0 2 2 0 2 4 0 2 1 1 0 1 1 2 1 1 0 1 0	4 6	poer	6	က	0	9	7	0	2
7 1 1 5 3 0 6 4 1 1 6 0 5 1 3 1 6 0 4 4 0 0 3 0 2 2 0 2 4 0 2 2 0 0 1 1 2 1 1 0 1 0	1,0	1) ISAE suit hatter	8	2	1	5	7	0	-
6 4 1 1 6 0 5 1 3 1 3 0 4 4 0 0 3 0 2 2 0 2 4 0 2 1 1 0 1 1 2 1 1 0 1 1	110	12 I I Samedish suit	_ /	-	1	5	3	0	4
5 1 3 1 3 0 4 4 0 0 3 0 2 2 0 2 4 0 2 2 0 0 1 1 2 1 1 0 1 1	100	A Difficult to acress	9	4	1	1	9	0	0
4 4 4 0 0 3 0 4 2 0 2 4 0 2 2 0 2 4 0 2 1 1 0 1 1 2 1 1 0 1 0	16	F Denicals to egicas	2	-	3	1	3	0	2
4 2 0 2 4 0 2 2 0 0 1 1 2 1 1 0 1 1	4 6	Door do do do the suith aloves on	4	4	0	0	3	0	1
2 2 0 0 1 1 2 1 1 0 1 0	7 6	o Puol dekielity with gloves on	4	2	0	2	4	0	0
2 1 1 0 1	7 0	Operation for the common and the com	2	2	0	0	-	1	0
	7 0	o Freier mye migered grove	2	-	1	0	1	0	1
	7	Booties wear out							

ALSS Survey Tally Sheet (FY-95-97) NAMRL

# Comment Total Jet Prop Helo Pliot NFO AC 1 Uncomfortable/bulky 355 0 1 0 0 0 0 1 2 Need longer sizes 37 27 2 15 26 4 1 13 4 Size like flight suit 12 7 0 5 2 15 26 4 1		Anti-Exposure Liner							
Comment Total Jet Prop Helo Pilot NFO 1 Uncomfortable/bulky 355 0 1 0									
355 0 1 0 0 0 0 73 27 7 39 49 11 12 7 0 5 8 3 10 3 3 4 8 1 8 5 2 1 7 1 6 4 0 2 6 0 4 0 2 6 0 4 3 0 1 3 1 2 1 0 2 0 1 2 1 0 2 3 0 1 1 0 1 0 1 1 1 0 1 0 1	#	Comment	Total	Jet	Prop	Helo	Pilot	NFO	AC
73 27 7 39 49 11 37 20 2 15 26 4 12 7 0 5 8 3 10 3 3 4 8 1 6 4 0 2 6 0 4 0 2 2 0 4 3 0 1 3 1 2 1 0 1 3 1 2 1 0 1 0 1 1 1 0 1 0 1 1 1 0 1 0 1	_	Uncomfortable/bulky	355	0	1	0	 0	0	-
37 20 2 15 26 4 12 7 0 5 8 3 10 3 3 4 8 1 8 5 2 1 7 1 6 4 0 2 6 0 4 0 2 2 0 4 3 0 1 3 1 2 1 0 1 3 0 1 1 0 1 0 1 1 1 0 0 1 0	2	Need longer sizes	73	27	7	39	49	11	13
12 7 0 5 8 3 10 3 3 4 8 1 8 5 2 1 7 1 6 4 0 2 6 0 4 0 2 2 0 4 3 0 1 3 1 2 1 0 2 3 0 1 1 0 1 0 1 1 1 0 0 1 0	e,	Restricts movement	37	20	2	15	 26	4	7
10 3 3 4 8 1 8 5 2 1 7 1 6 4 0 2 6 0 4 3 0 1 3 1 2 1 0 2 3 0 1 1 0 1 0 1 1 1 0 0 1 0 1 1 0 0 1 0	4	Size like flight suit	12	7	0	- 2	8	3	1
8 5 2 1 7 1 6 4 0 2 6 0 4 0 2 2 0 3 1 0 2 3 1 2 1 0 1 2 0 1 1 0 0 1 0 1 1 0 0 1 0	40	Does not fit with other gear	10	3	3	4	8	1	1
6 4 0 2 6 0 4 0 2 2 0 3 1 0 1 3 1 2 1 0 2 3 0 1 1 0 1 2 0 1 1 0 0 1 0 1 1 0 0 1 0	9	S Tight	æ	2	2	1	7	1	0
4 0 2 2 2 0 4 3 0 1 3 1 2 1 0 2 3 0 1 1 0 1 2 0 1 1 0 0 1 0 1 1 0 0 1 0		Do not like short liner	9	4	0	2	9	0	0
4 3 0 1 3 1 3 1 0 2 3 0 1 1 0 1 2 0 1 1 0 0 1 0 1 1 0 0 1 0	ω	Go back to green mesh	4	0	2	2	2	0	2
3 1 0 2 3 0 2 1 0 1 2 0 1 1 0 0 1 0 1 1 0 0 1 0	U)	Needs to be one piece	4	3	0	1	3	1	0
2 1 0 1 2 0 1 1 0 0 1 0 1 1 0 0 1 0	10	Need larger wrists	3	1	0	2	3	0	0
1 1 0 0 1 0 1 1 0 0 1 0	11	Use wet suit	2	1	0	1	2	0	0
1 1 0 0 1	12	Longer zipper needed to urinate easily	1	1	0	0	1	0	0
	13	Poor supply	1	1	0	0	1	0	0

ALSS Survey Tally Sheet (FY-95-97) NAMRL

Females			_							
# Comment		Total		Jet	Prop	Helo		Pilot	NFO	AC
1 Flight suit not made for female measurements	S)	20		7	9	7		11	9	7
2 Glove fingers are too long		14		0	2	2		6	4	1
3 More boot sizes needed		14		5	က	9		80	က	က
4 Flight suit requires disrobe for urination		14		2	4	8		11	-	2
5 Helmet poor fithot spots		11		1	9	4		æ	-	2
6 Poor helmet molding		11		4	4			4	က	4
7 Flight suit too long in the crotch		6		2	4	3		5	1	3
8 More glove sizes needed		8		4	4	0		2	3	0
		8		9	2	0		z,	က	0
10 SV-2 is bulky	:			1	2	4		9	1	0
11 Oxygen mask poor fit/need quick don		7		3	2	2		2	က	2
12 SV-2 is too big/poor fit		9		1	4	1		4	2	0
13 Anti-exposure suit liner fits poorly		2		1	က	1		3	2	0
14 Glove fingers rip open		2		2	-	2		-	က	-
15 Anti-exposure suit is difficult to don		2		1	က	1		4	1	0
16 Helmet hearing protection insufficient		5		0	2	င		4	1	0
17 SV-2 Heeds bottle a cockpit hazard		2		1	2	2		2	2	-
18 Anti exposure suit liner shrinks when washed	ı	4		1	3	0		3	0	1
19 O2 mask not easily compatible w glasses		4		2	2	0		2	7	1
		3		1	1	1		3	0	0
		က		0	1	2		2	1	0
22 Oxygen mask is a poor fit		3		0	1	2		3	0	0
23 Extra small sizes needed for jacket		2		0	0	2		2	0	0
24 Anti-exposure suit shoulder zipper is uncomfo	comfortable	2		0	1	1		2	0	0
25 Exposure fit neck fittings are uncomfortable		2		0	1	1		1	1	0
26 Flight jacket needs more shoulder room		2		1	0	1		1	0	1
27 Flight jacket too long		2		0	0	2		2	0	0
28 Need anti-exposure suit with diagonal zipper		2		0	2	0		0	2	0
29 Helmet ear pads press too hard		2		1	0	1		1	0	1
30 Poor pocket placement on new suit		2		1	-	0		1	1	0
31 Torso harness doesn't fit		1		0	0	1		-	0	0
32 Glove fingers slick when wet		1		1	0	0		0	-	0
33 Anti-exposure suit is too big/egress difficult		Ţ		0	0	1		1	0	0
34 O2 mask ICS hookup w helmet difficult		-		0	0	1		1	0	0
35 Oxygen snap fittings awkward		-		0	0	-		1	0	0
36 Anti-G suit fits poorly		_		0	0	٦		1	0	0
			4				1			

REPORT DOCUMENTATION PAGE

Form Approved OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

aperwork reduction radject (or 04-0100)	, **asimigion, DO 20000.		
AGENCY USE ONLY (Leave blank)	2. REPORT DATE 22 Dec 99	3.	REPORT TYPE AND DATES COVERED
(AMELIA) Summary 6. AUTHOR(S)	t Leading to Increased Accomm	■ '	FUNDING NUMBERS NAWC-AD & PMA-202 work unit 9307 B994
A.H Bransdorfer and K.R. J	ohnson		
 PERFORMING ORGANIZATION NA Naval Aerospace Medical Re 51 Hovey Road Pensacola, FL 32508-1046 	esearch Laboratory	8.	PERFORMING ORGANIZATION REPORT NUMBER NAMRL Technical Memorandum 99-01
 SPONSORING/MONITORING AGEN Naval Air Warare Center-Ai Bldg 439, Suite F 47110 Liljencrantz Road, Ur Patuxent River, MD 20670-1 SUPPLEMENTARY NOTES 	ircraft Division (NAWC-AD)	10.	SPONSORING/MONITORING AGENCY REPORT NUMBER
12a. DISTRIBUTION/AVAILABILITY ST	ATEMENT	12	b. DISTRIBUTION CODE
Approved for public release	e; distribution is unlimited.		
Anecdotal comments by nav Additionally, many aircrews Modified Equipment Leadin Marine Corps aircrew. The equipment appears to fit slig was rated slightly above the identified the flight suit as the identified as the number-one the use of urine collection de-	s (ALSS) equipment is a critical al aircrews have indicated that A in naval aviation are not satisfie g to Increased Accommodation sample population included 85 while the half with the exception of the number-one priority with respect to sure	ALSS equipment is ed with current uring (AMELIA) survey women and 1,970 in anti-exposure sure anti-exposure surect to safety, therrivability. The minus was a surveyed to safety, the minus and the safety and the safet	ponent for mission success in naval aviation. a perceived as ill-fitting and substandard, ne collection devices (UCDs). The Aircrew was completed by 2,055 U.S. Navy and nen. According to the survey results, ALSS at. The overall performance of current ALSS at (rated below the median). Aircrews nal protection, and comfort. The helmet was ajority of the sampled aircrew has required ted the piddle pack and relief tube as
14. SUBJECT TERMS Aviation equipment p	performance aircrew	survival	15. NUMBER OF PAGES 23 16. PRICE CODE
17. SECURITY CLASSIFICATION OF REPORT UNCLASSIFIED	18. SECURITY CLASSIFICATION OF THIS PAGE UNCLASSIFIED	19. SECURITY CLAS OF ABSTRACT UNCLASSIFI	ABSTRACT